

Paper Writing: The Results Section

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What Goes in Results?

- Results (but not all of them!)
 - Only those pertinent to the Question, whether supportive or not
- Use text to summarize/interpret the data presented in figures and tables
 - e.g., provide an estimate of effect size
 - DO NOT discuss implications of the results... save that for the Discussion

Communicating Effect Size

- 10.2% of patients who received Drug A had ED visits compared to 21.3% of those who received placebo.

Vs.

- The probability of an ED visit was 52% lower in those who received Drug A than in those who received placebo (10.2% vs. 21.3%).

Organization of Results -- 1

- 1 topic per paragraph
- Common to start with description of sample
- Good practice to show, or at least describe, derivation of sample (could go in Methods)
 - E.g., CONSORT diagram for RCTs
- Move from bivariate to multivariate analyses
 - I like to show raw data for main outcome analysis
 - Not always practical to do

Organization of Results -- 2

- Keep most data in tables and figures, not text
- Be concise: avoid unnecessary repetition
- Don't use a sentence to direct people to tables and figures
 - “The results of the experiment are presented in Table 2. Survival was 92% in those receiving drug A vs. 65% in those receiving placebo.”
 - “Survival was 42% greater in those receiving drug A than in those receiving placebo (92% vs. 65%) (Table 2).”

Organization of Results -- 3

- Put important results first in a paragraph
- Conveying a clear message in the text is the key
 - too much detail can obscure the message.

Statistical Details

- Most detail belongs in figures and tables
- Conventions
 - Mean and SD
 - 2.09 ± 0.98 (SD) liters, or $2.09 \pm$ (SD=0.98) liters
 - Comparisons
 - Airflow was significantly greater in men than women [$3.54 \pm$ (SD=0.54) vs. 2.87 ± 0.49 L, $P < 0.01$]
 - Avoid meaningless precision
 - “mean FEV1,% was 89.326 (13.428)” vs. “mean FEV1,% was 89.3 (13.4)”

Statistical Details

Conventions

- Use of significant digits to reflect rounding
 - 89% implies rounding to whole number
 - 89.0% implies rounding to nearest tenth
- Express data to no more than one significant digit than you measured
 - e.g., mean age was 43 years or 43.3 years, but not 43.32 years
- Use actual P values (not NS or the single threshold $P < 0.05$)
- Don't report p-values to more than 2 sig digits
 - 0.32 vs. 0.3238
- Generally don't report p-values beyond .000x
 - 0.0003 vs .00028
 - $<.0001$ vs. 0.0000043

Length

- As brief and uncluttered as possible
- Allow one to see forest, not just trees
- Journals will often limit number of figures and/or tables

SMART Trial

Figures and Tables

- Do we need p-values for tables 1-3?
- Are tables and figures easy to understand?
 - Labeling concerns?
 - Examples of false precision?
 - Is use of N (%) formatting in tables helpful?
- How helpful are figures 1-2?

SMART Trial

Presentation of Results

1st paragraph

“There were 26,355 subjects randomized to study treatment. Demographic characteristics and asthma history were similar between treatment groups and are summarized in Tables 1, 2.”

Vs.

“The baseline characteristics of the two treatment groups were similar (Table 1).”

- Could note # randomized in Methods;
- Table 2 doesn't compare treatment groups!

SMART Trial

Presentation of Results

2nd paragraph

“Exposure to study medication, subject disposition, ... are displayed in Table 3. Compliance was assessed by ... Mean study drug compliance was similar between groups.”

- Waste of space and restatement of Methods
- Table 3 also has a mix of baseline characteristics best covered in tables 1-2 and post-randomization adherence/follow-up data.

SMART Trial

Presentation of Results

3rd paragraph (main results)

“Primary and Secondary End Points

Total Population: The primary and secondary end points are shown in Table 4. For the primary end point, there were no significant differences between treatment groups in the number of subjects with respiratory death or life threatening experiences over the 28-week treatment period. There were ...”

- Wasted space, passive voice, and poor organization.
- Subsequent subheadings are: *occurrence of events by study phase and year, Caucasians, African Americans, and effects of concurrent ICS use*. Then shifts to major headings of *K-M analysis and adverse events*.

SMART Trial

Alternative Organization of Results

Primary End Point Analysis

For the overall ITT analysis, the rate of respiratory-related deaths or life threatening events over the 28-week treatment period, though higher for the salmeterol group (RR=1.40, 95% CI=0.91, 2.14), did not differ significantly between the two treatment groups (Table 4). Among African Americans, however, we did observe a large and statistically significant risks associated with salmeterol use (RR=4.10, 95% CI=1.54, 10.90).

Among the 16 asthma-related deaths that occurred, ... (Table 5). *[should say something about table 5... never present a figure or table and don't talk about it. I personally don't find it a very helpful table.]*

When we included events occurring during the 6-month post-intervention follow-up period as well, the estimated effect sizes decreased but still remained significant for African Americans (Table 6). ...

Secondary End Point Analyses

...

Vaccine Safety Study

Figures and Tables

- Good use of footnoting to clarify information in tables and figure
- Thoughts about showing frequency of missing data (e.g., table 1)?
- Confidence Intervals vs. p-values (your thoughts?)
- Absolute vs. relative differences
- Any issues with the figure?
 - How stable are the estimates?
 - Is it important to show?

Vaccine Safety Study

Presentation of Results

1st paragraph

“Of the 2032 patients who were enrolled and assigned to receive vaccine and placebo injections, 2009 (98.9%) received both injections, 1952 (96.1%) received both injections and completed both 14-day post injection diaries, and 1865 (91.8%) had expiratory flow rates measured during both periods (the daily measurement of peak expiratory flow rate was not required in patients who were three to five years old).”

- Whew! What a mouthful.
- excess detail; break it up; move some to Methods

Vaccine Safety Study

Presentation of Results

1st paragraph (characteristics of sample)

“There were more boys than girls and more women than men enrolled, as would be expected on the basis of the age and sex distribution of asthma in the United States (ref).”

Vs.

“The age-related gender differences are consistent with national data (ref).”

- Should comparison with national data be moved to Discussion instead?

Vaccine Safety Study

Presentation of Results

2nd paragraph (main findings)

“The overall rates of exacerbations of asthma during the 14 days after vaccine injection and the 14 days after placebo injection were equivalent (28.8% and 27.7%, resp, abs diff 1.1%, 95% CI -1.4% to 3.6%) (Table 2). The most common types of exacerbation were an increase in the use of rescue medications and a decrease of 30% or more in the PEFr from the personal best value.”

- Hard to improve on this; perhaps forego restating data, though it's perfectly okay as is.
- Might want to mention other outcomes in table 2.

Vaccine Safety Study

Presentation of Results

3rd paragraph (subgroup analyses)

“The frequency of exacerbations varied considerably among the subgroups that were categorized according to ...; however none of the differences in values after vaccine and placebo injections were significant. All 95% CIs were consistent with the conclusion that there was no difference in the rates after vaccine injection and placebo injection (Table 3).”

- Way too wordy, and second sentence is totally redundant with the first one.

Vaccine Safety Study

Presentation of Results

3rd paragraph (alternate version)

“Although the frequency of exacerbations varied considerably across subgroups, within any given subgroup we observed no significant differences following vaccine and placebo injections (Table 3).”

- Same information, but much more compact and easy to digest.

Vaccine Safety Study

Presentation of Results

4th paragraph (other outcomes)

“There was no significant difference between vaccine injection and placebo injection in other asthma-related outcomes, including ... (Table 4).”

- Again, way too wordy
- Also starts off with “there was”

Vaccine Safety Study

Presentation of Results

4th paragraph (revised)

“We also observed no significant differences in other asthma-related outcomes between vaccine and placebo injections (Table 4).”

- Short, sweet, and perfectly clear
- Reader can go to table for full list
- No need to say “injection” twice

Air Quality Study

Figures and Tables

1. How helpful is figure 1?
2. Are both figures 2 and 3 needed? If not, which is more useful?
3. What is the message of table 1? Can the table be improved?
4. Are the other tables clear and useful?

Air Quality Study

Organization of Results

1. % change in acute asthma hcu relative to “baseline”
2. Comparison w/ similar change in non asthma hcu
3. RR analysis of hcu changes
4. Changes in daily [ozone] in Atlanta
5. Changes in [ozone] outside of Atlanta
6. Aggregate changes in ozone and other pollutants
7. Change in temp, wind speed, solar radiation, and barometric pressure. Also changes in [mold] and asso of latter with acute asthma hcu
8. Changes in traffic patterns from baseline
9. Statewide gasoline sales (not available just for Atlanta)
10. Association of traffic counts with [ozone]
11. Association of [ozone] and acute asthma hcu (indep of Olympics)
12. Impact of using 2- or 3-day cumulative exposure measures instead of 1-day to study asso of [ozone] and [PM10] with asthma hcu

Air Quality Study

Organization of Results

- Apart from information overload, the organization of information is poor
 - Start by documenting that your intervention worked (ie., traffic patterns changed)
 - Show relationship to air quality levels
 - Wind up with impact on acute asthma hcu
- Stay focused on The Question
 - Methodological issue of 1-day vs. cumulative exposure is tangential to main focus of paper
 - Gasoline sales data much softer than traffic pattern data...drop it or only very briefly mention it